REMARKS

Claims 22-42 are pending in this application. For purposes of expedition, claims 28 and 41 have been amended to correct a typographical error. All claims 22-42 are presented herewith for purposes of completeness and for the Examiner's convenience.

As a preliminary, the Examiner's several courtesies extended to Applicants' representative during the several telephone interviews conducted on March 26, 2004 are noted with appreciation. While the Petition under 37 C.F.R. §1.181 filed on February 2, 2004 has **not** been decided by the Office of Petition, Applicants expect the Petition will be granted and have taken the liberty, at the Examiner's recommendation, to respond to the outstanding Office Action (an unnumbered paper) dated on December 29, 2004 in order to avoid undue extension of time and to afford the new Examiner additional time to conduct a proper examination of all claims 22-42 as pending in the application.

As previously discussed in the Petition under 37 C.F.R. §1.181 filed on February 2, 2004, the outstanding Office Action (an unnumbered paper) dated on December 29, 2003 is premature and incomplete, because the previous Examiner has completely ignored Applicants' request for clarification, and Applicants' detailed explanations as to how each of the claims 22-42 as pending in the application distinguishes over each of the references under category "X' and "Y" in the PCT application, even though none of these references was ever cited to support any rejection under 35 U.S.C. §102/103 as required under 37 C.F.R. §1.104.

In addition, the previous Examiner has also repeatedly and incorrectly identified the claims as pending in the application, that is, claims 1-28, as opposed to

the actual claims 22-42 as pending in the application. Moreover, the previous Examiner has repeated the same unintelligible, incoherent response as set forth in the previously Office Action, and further stated that,

> "**New Claims 29-xx**
> New Claims 20-xx added by this amendment are dependent claims depending upon pending claims.
> **Conclusion**
> It is submitted that the added claims are supported by the application as filed and added no new matter.
> This statement is not understood and should be clarified or canceled.
> And a proper response filed."

In fact, the Examiner's statements presented in all three Office Actions, including the first Office Action (Paper No. 3) dated on October 29, 2002, the first non-final Office Action (an numbered paper) dated on April 24, 2003, and the second non-final Office Action (another unnumbered paper) dated on December 29, 2003, are inadequate, and do **not** constitute any types of rejections of Applicants' pending claims 22-42 under either 35 U.S.C. §102 or 35 U.S.C. §103 as mandated by 37 C.F.R. §1.104 and MPEP §707.

In particular, the Office Action (another unnumbered paper) of December 29, 2003, is incomplete, because claims 1-28 under rejection as identified by the Examiner are **not** the claims as pending in the application. Moreover, even if claims 1-28 were somehow pending in the application, the Examiner's reference to "New Claims 29-xx" which is allegedly "added by this amendment" is completely baseless, particularly when no new claim has been added in the Amended filed on August 25, 2003.

As previously explained, the burden of establishing a basis for denying patentability of Applicants' claims 22-42 under 35 U.S.C. §102 and 35 U.S.C. §103

rests upon the Examiner, and **not** with the Applicants. Applicants were **not**, and are **not** obligated under 37 C.F.R. and MPEP to explain and point out to the Examiner as to why claims 22-42 are patentable under 35 U.S.C. §102 and 35 U.S.C. §103, particularly, when no art has been cited or specified by the Examiner, and the Examiner has not provided any explanation as to how each feature of Applicants' claims 22-42 is anticipated under 35 U.S.C. §102 or rendered obvious under 35 U.S.C. §103 by any of the prior art references, allegedly labeled as "X" and "Y" references as discussed in the PCT note.

Under 35 U.S.C. §102 and §103, the Examiner bears the initial burden of establishing a *prima facie* case of anticipation or obviousness. Only if this burden is met does the burden of coming forward with rebuttal argument or evidence shift to the Applicants. Ex parte Levy, 17 USPQ2d 1461, 1462 (1990) expressly states:

> "it is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference."

In addition, 37 CFR §1.106(b) requires the Examiner, when rejecting Applicants' claims 22-42 for want of novelty or for obviousness, must cite the best references at his command. When a reference is complex or shows or describes inventions other than that claimed by the Applicants, the particular part relied upon must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.

In the present situation, the Examiner has **not** explained how any of the "X" and "Y" references listed in the PCT sheet, including allegedly: (1) JP 1-109249, A (Kurt Sauerwein); (2) JP 63-225153, A (Omron Tateishi Electronics Co.); (3) JP 5-

107202, A (Hitachi, Ltd.); (4) JP 8-2601, Y2 (Meidensha Corp.); (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd); (6) JP 6-118062, A (Toshiba Corp.); and (7) JP 4-12258, A (Marktec Corp.), teaches each and every elements or at least renders those elements as defined in Applicants' claims 22-42 unpatentable.

Nevertheless, in the spirit of expedition and cooperation, Applicants have endeavored to explain in detail as to the nature of Applicants' disclosed invention and how each of the claims 22-42 as pending in the application distinguishes over each of the references under category "X' and "Y" in the PCT application, as presented in the Amendment filed on August 25, 2003.

For example, Applicants' disclosure invention was described in the Amendment filed on August 25, 2003, as relating to different aspects of a deficiency inspection apparatus as shown in FIG. 2, including, for example, a specimen 1, an image memory 4, a host computer 5, a color display 6, a data memory device 7, a power supply 8, a color camera 21, a polarization filter 22a, an ultraviolet filter 22b, a polarization filter plate 23, a white illuminating lamp 24a, an ultraviolet illuminating lamp 24b and cables 25a-25b. FIG. 5 is a flowchart illustrating an automatic inspection technique in a penetrant inspection according to an embodiment of the present invention. FIG. 7 shows a structure for camera calibration to perform the camera calibration process shown in FIG. 8. FIG. 15 is a flowchart illustrating an image processing algorithm in a magnetic particle inspection according to another embodiment of the present invention. Other drawings, including FIGs. 3-4, 6, 9-14 and 16-22 show the many other aspects of Applicants' disclosed invention.

However, the two major aspects of Applicants' disclosed invention relate to the magnetic particle inspection and the penetrant inspection. The magnetic particle

inspection is basically characterized by (a) picking up an image of a surface of the specimen by using a color camera through a filter which cut off reflected light of the irradiated ultraviolet light; (b) detecting (extracting) a deficiency candidate on the surface by using a green (G) signal component of an image acquired by said color camera; (c) displaying an image of a detected deficiency candidate on a screen; and (d) storing the displayed image in a memory so as to be able to re-check the deficiency by redisplaying the stored image on the screen. Next, the penetrant inspection is basically characterized by (a') picking up an image of a surface illuminated with polarized light by a color camera via a polarization filter, wherein such a camera is calibrated by using camera calibration color chart for inspection; (b') converting RGB data of the picked up image to chromaticity (x,y) and luminance Y; (b") detecting (extracting) a deficiency candidate on the surface by using information of the chromaticity (x,y) and luminance Y converted from the RGB data of said image; (c) displaying an image of a detected deficiency candidate on a screen; and (d) storing the displayed image in a memory so as to be able to re-check the deficiency.

Claims 22-42 have previously been amended to emphasize in various scope of coverage these two aspects of Applicants' disclosed invention. For example:

Claims 22 and 33, as previously amended, define a deficiency inspection method based on a magnetic-particle inspection scheme, comprising the step of picking up a color image of fluorescent magnetic powder of the specimen by using a color camera through a filter which cut off reflected light of irradiated ultraviolet fight (P9 lines 11~P10 lines 2 of the specification); and the step of detecting a deficiency

candidate by using a green (G) signal component of said image acquired by said color camera (P18 lines 24~P16 lines 9 of the specification)."

None of the cited "X" and "Y" references listed in the PCT sheet, including allegedly: (1) JP 1-109249, A (Kurt Sauerwein); (2) JP 63-225153, A (Omron Tateishi Electronics Co.); (3) JP 5-107202, A (Hitachi, Ltd.); (4) JP 8-2601, Y2 (Meidensha Corp.); (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd); (6) JP 6-118062, A (Toshiba Corp.); and (7) JP 4-12258, A (Marktec Corp.), discloses or suggests the features of Applicants' base claims 22 and 33.

Perhaps, the most relevant reference is reference #2 (JP 63-225153). However, such a reference only discloses that,

> "Moreover, if Parts 21a and 21b are not correctly mounted as shown in Fig. 4 (A), among the image signal of the line a outputted from this TV camera 37, the R signal is set to a high level only with adhesive portion 28 as shown in Fig. 4 (B), and as shown in Fig. 4 (C), the G signal serves as a high level only with the portion except adhesive portion 28. Moreover, B signal in the image signal serves as a low level on the whole, as shown in Fig. 4 (D)."

Moreover, such a reference only relates to a substrate inspection method for inspecting the mount state of an electric part wherein not only a pre-flux emitting fluorescence having a wavelength λ 1 but also an adhesive emitting fluorescence having a wavelength λ 2 are applied to a substrate to mount the electric part thereto and the mount state is judged by discriminating the color of the image pickup result picked up the image of the substrate.

Reference #1 (JP 1-109249, A: USP No. 5,047,851) does **not** disclose the step of "detecting a deficiency candidate by using a green (G) signal component of said image acquired by said color camera" as defined by Applicants' base claims 22 and 33.

Similarly, claims 24 and 37, as previously amended, define a "deficiency inspection method based on a magnetic-particle inspection scheme, comprising the step of picking up a fluorescent image of fluorescent magnetic powder of the specimen by using a color camera through a filter which cut off reflected light of irradiated ultraviolet light (P9 lines 11 – P10 lines 2 of the specification); and the step of displaying an image acquired by said color camera on a screen in nearly the same state as an image acquired by visually observing said surface irradiated with said ultraviolet rays (P10 lines 14-lines 24 of the specification)."

Again, reference #1 (JP 1-109249, A: USP No. 5,047,851) only discloses that "by means of the optical filter 5 the background picture can be largely masked out, so that essentially only fluorescent light reaches the pick-up part of the color television camera 3 through the lens 4."

Reference #3 (JP 5-107202, A Hitachi, Ltd.) only discloses a magnetic particle examination equipment for magnetic testing. Enclosed for the Examiner's convenience is an English translation of the Japanese application.

Reference #4 (JP 8-2601, Y2, Meidensha Corp.) only discloses a visual inspection apparatus of wire harness that has nothing to do with the subject matter of Applicants' base claims 24 and 37.

Claim 25, as previously amended, defines "a deficiency inspection method based on a magnetic particle inspection scheme, comprising the step of picking up a fluorescent image of fluorescent magnetic powder of the specimen by using a color camera through a filter which cut off reflected light of irradiated ultraviolet light (P9 lines 11 – P10 lines 2 of the specification); the step of extracting deficiency

candidates from an image acquired by said color camera; and the step of displaying images of said extracted deficiency candidates on a screen (Fig. 18 - Fig. 19).".

Again, none of the cited "X" and "Y" references listed in the PCT sheet, including allegedly: (1) JP 1-109249, A (Kurt Sauerwein); (2) JP 63-225153, A (Omron Tateishi Electronics Co.); (3) JP 5-107202, A (Hitachi, Ltd.); (4) JP 8-2601, Y2 (Meidensha Corp.); (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd); (6) JP 6-118062, A (Toshiba Corp.); and (7) JP 4-12258, A (Marktec Corp.), discloses or suggests the features of Applicants' base claim 25, including "the step of extracting deficiency candidates from an image acquired by said color camera and the step of displaying images of said extracted deficiency candidates on a screen."

Claim 26, as previously amended, defines "a deficiency inspection method based on a penetrant inspection scheme, comprising the step of picking up an image of a surface of a specimen by using a color camera; the step of converting RGB data of the picked-up image to chromaticity and luminance {based on expression of relations (equation (1) and equation (2)) between the RGB values and the chromaticity value and the luminance value which have been measured by a colorimeter beforehand} (P14 lines 23 - PI5 line 4 of the specification); and the step of detecting a deficiency candidate on said surface by using information of said chromaticity and luminance converted from said RGB data of said converting step (P16 lines 11 - P18 lines 21).".

Again, none of the cited "X" and "Y" references listed in the PCT sheet, including allegedly: (1) JP 1-109249, A (Kurt Sauerwein); (2) JP 63-225153, A (Omron Tateishi Electronics Co.); (3) JP 5-107202, A (Hitachi, Ltd.); (4) JP 8-2601, Y2 (Meidensha Corp.); (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd); (6) JP 6-

118062, A (Toshiba Corp.); and (7) JP 4-12258, A (Marktec Corp.), discloses or suggests the features of Applicants' base claim 26.

Claim 27, as previously amended, defines "a deficiency inspection method based on a magnetic-particle inspection scheme, comprising: the step of picking up an image of said surface illuminated with said polarized light by a color camera via a polarization filter (P9 lines 11 - lines 24), said color camera being calibrated by using camera calibration color chart for inspection (P12 lines 25 - P14 lines 22; Fig. 7 and Fig. 8); the step of extracting deficiency candidates from said image acquired by said color camera; and the step of displaying images of said extracted deficiency candidates on a screen (P20 lines 8 - P21 lines 8)."

Again, none of the cited "X" and "Y" references listed in the PCT sheet, including allegedly: (1) JP 1-109249, A (Kurt Sauerwein); (2) JP 63-225153, A (Omron Tateishi Electronics Co.); (3) JP 5-107202, A (Hitachi, Ltd.); (4) JP 8-2601, Y2 (Meidensha Corp.); (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd); (6) JP 6-118062, A (Toshiba Corp.); and (7) JP 4-12258, A (Marktec Corp.), discloses or suggests the features of Applicants' base claim 27.

Claims 28 and 38, as previously amended, define "a deficiency inspection method for magnetic-particle-inspection scheme or penetrant-inspection, comprising the step of picking up an image of a surface of a specimen by a color camera with positional information of a visual field of said color camera which is calibrated by using camera calibration color chart for inspection (P12 lines 25 - P14 lines 22); the step of detecting deficiency candidates in said surface by processing (penetrant processing) a color signal of said image acquired by said color camera; and the step

of displaying images of said detected deficiency candidates on a screen together with said positional of said visual field (P20 lines 8 - P21 lines 8)".

Claim 31, as previously amended, defines "a deficiency inspection method for magnetic-particle-inspection scheme or penetrant-inspection, comprising the step of displaying images of said extracted deficiency candidates on a screen; and the step of distinguishing a pseudo deficiency among said deficiency candidates displayed on said screen." (see FIG. 17)

Claim 32, as previously amended, defines "a deficiency inspection method comprising the step of displaying images of said deficiency candidates on a screen; and the step of storing said displayed image of said deficiency candidates with information of feature characteristics of said deficiency candidate in a memory."

Claim 35, as previously amended, defines "a deficiency inspection apparatus, comprising: image pickup means for picking up an image of said surface by a color camera which is calibrated by using camera calibration color chart for inspection (P12 lines 25-P14 lines 22; Fig. 7 and Fig. 8); and display means for displaying image of said deficiency candidates detected by said magnetic-particle-inspection-originated deficiency-candidate extraction means or said penetrant-inspection-originated deficiency candidate extraction means."

Specifically, on P12 lines 25 - P13 lines 11 of Applicants' disclosure, it is described that "color calibration is executed beforehand using a camera calibration color card 71 as shown in Fig. 7 in order to perform high-precision conversion of RGB data to chromaticities (x,y) and luminance (Y). The flow of that process is shown in Fig. 8. The camera calibration color card 71 has three or more colors painted. The colors are picked up by the color video camera 21 (81), and the RGB

values of the individual colors are computed (82). The chromaticities (x,y) and luminance (Y) are measured (83) by a colorimeter 72. The relationship between the RGB values and (x,y) (Y) values is expressed by equation (1) and (2)."

Claim 36, as previously amended, defines "a deficiency inspection apparatus for magnetic-particle-inspection, comprising: a deficiency-candidate detector which detects deficiency candidates on said surface from said image of said surface picked up by said camera by using a green (G) signal component of said image; and display unit which displays information of said images of said deficiency candidates stored in said storage section on a screen."

Claim 39, as previously amended, defines "a deficiency inspection apparatus, comprising: illuminating means for illuminating light on a surface of a specimen to which a penetrant-inspection treatment is applied; image pickup means for picking up an image of said surface illuminated by said illuminating means by a color camera; converter means for converting RGB data of the image picked-up by said image pickup means to chromaticity and luminance [based on expression of relations (equation #1 and equation #2), see page 14, line 23 extending to page 15, line 4 of Applicants' disclosure]; deficiency-candidate detecting means for detecting deficiency candidates on said surface from said image picked-up by said color camera of said image pickup means [see page 16, line 11 extending to page 18, line 21 of Applicants' disclosure]; display means for displaying images of said deficiency candidates detected by said deficiency-candidate detecting means; and memory means for storing displayed images with data of chromaticity and luminance obtained by said converter means [see page 16, line 11 extending to page 18, line 21 of Applicants' disclosure."

Lastly, claim 40, as previously amended, defines "a deficiency inspection apparatus, comprising: illumination means for illuminating a surface of a specimen to which a penetrant is temporarily applied with white light; image pickup means for picking up an image of said surface by a color camera which is calibrated by using camera calibration color chart for inspection camera; magnetic-particle-inspection-originated deficiency-candidate detecting means for detecting magnetic-particle-inspection originated deficiency candidates on said surface from a green (G) signal component of said image of said surface picked up by said image pickup means; penetrant-inspection-originated deficiency-candidate detecting means for detecting penetrant-inspection-originated deficiency candidates on said surface from said image picked up by said image pickup means; and display means for displaying images of said deficiency candidates detected by said magnetic-particle-inspection-originated deficiency-candidate detecting means or said penetrant-inspection-originated deficiency-candidate detecting means."

Again, none of the cited "X" and "Y" references listed in the PCT sheet, including allegedly: (1) JP 1-109249, A (Kurt Sauerwein); (2) JP 63-225153, A (Omron Tateishi Electronics Co.); (3) JP 5-107202, A (Hitachi, Ltd.); (4) JP 8-2601, Y2 (Meidensha Corp.); (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd); (6) JP 6-118062, A (Toshiba Corp.); and (7) JP 4-12258, A (Marktec Corp.), discloses or suggests the features of Applicants' base claims 22-42.

In view of the foregoing explanations and remarks, all claims 22-42 are believed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is

requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 520.40381X00), and please credit any excess fees to said deposit account.

Respectfully submitted,

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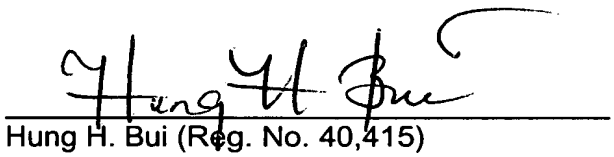
By 

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